

REMARKS/ARGUMENTS

This communication is responsive to the outstanding Office Action of April 15, 2003 in connection with the above-referenced patent application. The Office Action of April 15, 2003 had been under final. Accordingly, a Request for Continued Examination accompanies this amendment and response.

In the Office Action of April 15, 2003, the Examiner maintained the rejection under 35 U.S.C. § 102(b) over claims 4 and 5 as being anticipated by either one of Einfeld (U.S. 3,222,521) or Caldwell et al. (U.S. 4,483,816). In addition, the Examiner rejected claims 6-10 under 35 U.S.C. § 103(a) as being unpatentable over Caldwell et al. (U.S. 4,483,816) in view of the combination of Caldwell et al. (U.S. 4,497,768¹) and Maniscalco et al. (U.S. 4,344,911).

Applicant has now amended claims 4 and 6 in response to the rejections set forth in the Office Action of April 15, 2003. Specifically, claim 4 has been amended to incorporate the limitations of claim 5 therein (claim 5 now being canceled) and claim 6 has been amended to reflect that the neutron multiplier material need not be limited to lead. Further, claim 4 has also been amended to positively recite limitations which the Examiner had identified as "intended or desired" uses.

In addition to the above, new claims 11-14 have been added to reflect additional patentably distinct features of the invention of the present application.

Accordingly, claims 4 and 6-14 are now pending.

With respect to the rejections, the following remarks/arguments are made:

¹We note that the Examiner improperly referred to the secondary Caldwell et al. patent as U.S. 3,796,876. The '876 patent is the Krininger et al. patent utilized in the previous Office Action of August 13, 2002. Because the Examiner references the secondary Caldwell et al. reference as teaching "a neutron source (4)" in Figure 1, it is our belief that the Examiner merely misidentified the Caldwell et al. patent number as the '876 patent.

The Rejections Under 35 U.S.C. §102(b)

The Examiner has maintained the previous rejections under 35 U.S.C. §102(b) over each of the Caldwell et al. ('816) and Einfeld ('521) patents as set forth previously.

Applicant respectfully traverses these rejections.

Initially, Applicant would like to point out that in order to anticipate a claim, each and every limitation of the claims must be identically found in a single reference. See *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Presently, independent claim 4 now recites:

- a) "means for irradiation of an object by generating a sequence of initial fast neutron pulses which comprises a neutron flux consisting of thermal, epithermal and fast neutrons";
- b) "means for counting neutrons and for measuring, prompt and delayed neutronic signals emitted by the object after each pulse"; and
- c) "means for accumulating the measured prompt and delayed signals and, after the last pulse, for obtaining the sum of all signals...by calibration".

Applicant submits that these limitations, previously ignored by the Examiner as not being positive limitations in claim 4, are now believed to be positive claim limitations. Accordingly, Applicant submits that the cited references of Caldwell et al. ('816) and Einfeld ('521) fail to teach these claim limitations identically as required by 35 U.S.C. §102.

Moreover, as indicated in the present description, the object of the present invention is to make it possible to obtain information about the presence and quantity of at least one additional material with respect to Caldwell '816 (see present specification, e.g., page 3, lines 5-12), namely, at least one fertile material such as, e.g., uranium 238. The prior art fails to teach a device which is capable of doing this.

Caldwell et al. '816 analyzes waste packages having a military origin and validly makes the hypothesis that the contribution of a fertile material, such as, e.g., uranium 238, to the measured signal is negligible with respect to the fissile materials. In the present invention, such a hypothesis is not made and it is possible to analyze waste packages resulting from the reprocessing of irradiated fuel materials from nuclear reactors. In such a case, the above-mentioned hypothesis cannot be made because the mass of uranium 238 is the largest and therefore, the contribution of uranium 238 to the delayed neutron signal is no longer negligible. Therefore, it becomes necessary to measure an additional element. Caldwell et al. '816 fails to provide a means for accomplishing this additional aspect of the invention.

In addition, it should be noted that fission prompt neutrons are measured between 0.5 ms and 1 ms; they only result from thermal fissions and therefore, merely relate to fissile elements such as uranium 233, uranium 235, plutonium 239 and plutonium 241. The fission delayed neutrons are measured beyond 1 ms; they result from thermal fissions and fast fissions and therefore, relate to fissile elements and fertile elements.

Einfeld is even further removed from the invention than Caldwell et al. ('816). In Einfeld, two irradiations are carried out at two different initial energy levels and only prompt neutrons resulting from thermal fissions are measured whereas in the present invention, a single irradiation-measurement is carried out at a single initial energy level but is used at two different moments via the measurement of two signals namely, a signal resulting from prompt neutrons, as Einfeld, but also another signal resulting from delayed neutrons. So, concerning Einfeld, the use of these measurements would, for example, make it possible to measure two fissile elements such

as uranium 235 and plutonium 239 whereas in the present invention, the use of these measurements makes it possible to measure, for example, three fissile elements such as uranium 233, uranium 235 and plutonium 239 and one fertile element such as uranium 238.

Accordingly, Applicant submits that the cited art of Caldwell et al. ('816) and Einfeld ('521) fail to anticipate claim 4 (or any claim dependent therefrom) as these references fail to recite each and every limitation identically as required by 35 U.S.C. §102. As such, Applicant respectfully requests withdrawal of this rejection.

REJECTION UNDER 35 U.S.C. § 103(a)

Next, the Examiner rejected claims 6-10 under 35 U.S.C. §103(a) as being unpatentable over Caldwell et al. ('816) in view of the combination of Caldwell et al. ('768; improperly identified as U.S. 3,796,876 as discussed previously) and Maniscalco et al. (U.S. 4,344,911).

Briefly, the Examiner is of the position that Caldwell et al. ('816) teaches the claimed invention except for the location of the neutron source in a fourth side of the containment and the use of a neutron multiplier material. The Caldwell ('768) patent is then alleged as teaching the use of a neutron source (4) disposed on a wall of the irradiating chamber while Maniscalco et al. is said to teach the use of lead as a neutron multiplier. The Examiner then reasons that the combination of these teachings renders the invention of claims 6-10 obvious.

Applicant respectfully traverses this rejection.

Initially, for the same reasons as set forth in the discussion of Caldwell et al. ('816) with respect to the rejection under 35 U.S.C. §102, Applicant is of the position that Caldwell et al. ('816) fails to teach the limitations of the device of claim 4 as presently amended. As such, the claims dependent therefrom (claims 6-10 along with new claims 11-14), which also contain all of

the limitations of claim 4 from which they ultimately depend, also do not have all the limitations taught by the cited art of Caldwell et al. ('816) as set forth by the Examiner.

In addition to the above, it should be noted that claims 9 and 11 (which include all the limitations of claims 4 and 6, amended as herein above indicated) use a containment comprising a neutron poison material and a neutron multiplier material in order to take fissile materials into account. Contrary to Caldwell et al. ('816) wherein a conventionally thermalized containment is used, the present invention uses a containment provided with a neutron absorber (neutron poison material) which makes it possible to reduce the thermal flux/fast flux ratio and therefore to increase the contribution of the fast neutron flux to the induced fissions and thus to intensify the response of the fertile materials in the signal of the delayed neutrons. Such embodiments make it possible to improve the measurement proposed by Caldwell et al. ('816) by strengthening the components resulting from the fast fissions in the delayed neutron signal.

Also, new claims 12 and 13 require the presence of a fertile isotope ($N = 1$), such as, uranium 238 (claim 13). This is clearly outside any of the prior art teachings as set forth by the Examiner.

Applicant submits that the Caldwell ('768) and Maniscalco ('911) patents fail to remedy the noted deficiencies of Caldwell et al. ('816). Accordingly, Applicant believes that the Examiner has failed to establish that the invention, as now claimed, would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made. As such, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. §103.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the

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application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 33126.

Respectfully submitted,

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